IPM-CPR

Integrated Pest Management Crop Perimeter Restructuring

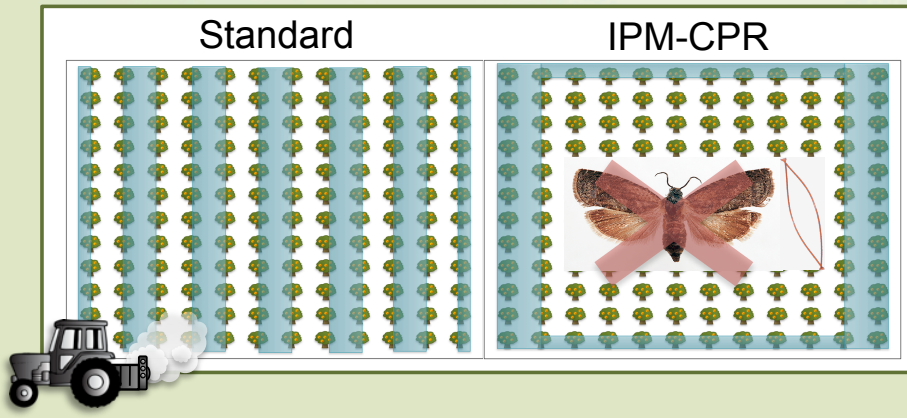
Anne L. Nielsen, Brett R. Blaauw and Dean Polk

The invasive brown marmorated stink bug (BMSB) has disrupted long-standing tree fruit IPM programs resulting in changes in management practices to combat the threat posed by this invasive pest. Current management tools for BMSB rely on weekly, season-long applications of broad-spectrum insecticides that are costly, risk pest resistance, and may cause secondary pest outbreaks. The goal of IPM-CPR is to re-introduce common IPM practices (phenology based, reduce risk insecticide usage, mating disruption, and biological control) back into tree fruit management while incorporating BMSB management. The implementation of IPM-CPR for the management of key tree fruit pests may be less costly, more sustainable, enhance biological control. It has been demonstrated to be just as effective as current standard management methods. IPM-CPR is composed of the following tactics:

IPM-CPR	Phenological Model	Pesticide Use	Mating Disruption	Biological Control
	• BMSB dispersal into peach at 144-250 DD_{57} • BMSB population peak at 1000-2000 DD_{57}	• Apply only to border row trees within the orchard • At least 2 insecticide classes • Ground cover management	• Resistance management • Lowers population pressure over time • No effect on non-targets	• Natural enemy conservation in orchard interiors

IPM-CPR management is aimed at controlling populations of key orchard pests through the use of common IPM tactics. This strategy reduces the amount of insecticide applied while leaving insecticide class usage up to the grower's discretion. IPM-CPR is a aimed at controlling the following:

Pest	Management
Tarnished plant bugs and other catfacing insects	Treat the orchard floor with Clopyralid 40.9% during the first week of May at the rate of 4 oz/A to control broad-leaf weeds (i.e. clover)
Oriental fruit moth and codling moth	Deploy mating disruption dispensers (OFM TT at 100/acre or OFM/CM TT at 200/acre) in early May
Brown marmorated stink bug	Weekly insecticide treatment on the outside edge and the first full row of the orchard border (see diagram below)



Comparison of the standard alternate row middle insecticide application with the IPM-CPR orchard layout with ground floor herbicide, mating disruption, and border insecticide application. Border focused insecticide application can reduce insecticide use by 50-75%.

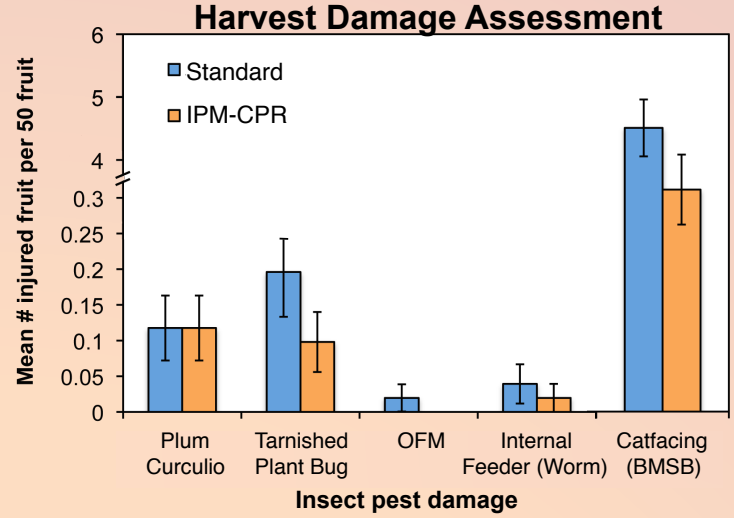
Results from IPM-CPR

From Two Years of Implementation

A field trial was implemented at commercial peach orchards in NJ to evaluate the IPM-CPR, utilizing behaviorally-based tactics for management of key orchard pests – BMSB, OFM, and tarnished plant bugs. The following is a summary of the results from three years of implementation of the IPM-CPR strategy at the commercial peach orchards. Depending on the grower practice, border spray application from May through harvest can save up to 50% on insecticide cost and with the inclusion of mating disruption and herbicide use, IPM-CPR is slightly more expensive than the grower standard.

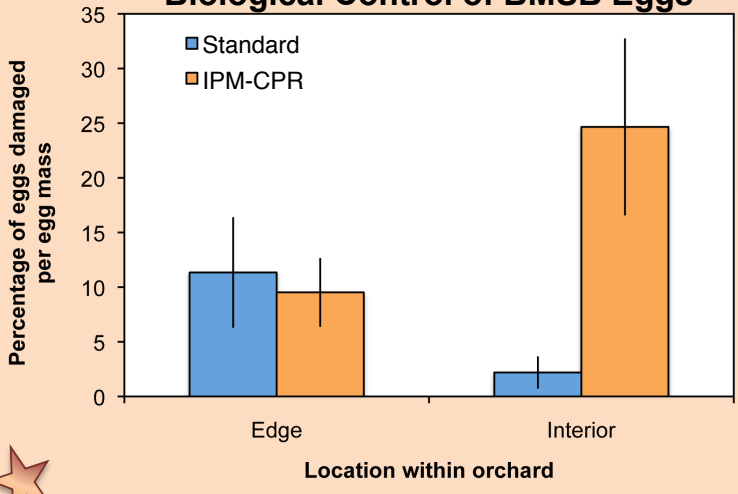
	Farm	Border Spray Only	IPM-CPR	ARM	Whole Block
Cost/Acre	1	$25	$75	$55	$110
	2	$75	$130	$145	$285
	3	$40	$95	$65	$140

Harvest Damage Assessment



- IPM-CPR provided BMSB and OFM control at levels equal to grower standards in Jerseyqueen and PF-24
  - Potentially better along crop perimeter where insecticide is applied weekly
- Peaches were assessed at harvest for insect injury
  - OFM populations were lower with IPM-CPR and had no live larvae in the fruit
  - Other catfacing was lower with the IPM-CPR

Biological Control of BMSB Eggs



- IPM-CPR reduced insecticide use by 50-75% compared to standard grower practices
  - Less insecticide is better for beneficial insects like natural enemies and pollinators
- Shown in the figure on the left, IPM-CPR orchards had increased levels of biological control of BMSB eggs

IPM-CPR significantly reduced the amount of area managed for control of BMSB, while simultaneously managing these pests at levels equal to current grower standard practices. Thus, this tactic reduces insecticide usage, is comparable in price, and potentially supports beneficial insects for the enhancement of biological control and pollination.